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THE MECHANISM OF THE CONVERSIONS OF THE PRODUCTS OF THE INCOMPLETE COMBUSTION ON POLIMETALL ADSORBTION-KATALISIS-CHEMOSORBCION SYSTEM

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Abstract

In article is considered possibility of the catalytic conversion and chemosorption of the products of the incomplete combustion on actuated oxides alkaline, alkaline earth and amphoteric metal and metal with connecting valence sufficient as iron and manganese, bring about forming the join metal at peelings of the gas flow from products of the incomplete combustion. It is determined that in process chemosorption is formed join metal, which is accumulated in time sorption-catalytic system. The studied mechanism of the oxidation of the products of the incomplete combustion on oxides alkaline, alkaline earth, amphoteric metal and metal with connecting valence, as iron and manganese containing systems. Physics-chemical and spectral analysis is installed that, at xemosorbtion of the products of the incomplete combustion ion Mn^{4+}, Mn^{3+} and Fe^{3+} moves over to undermost valence of the condition and form to salts. It is *revealed that clear industrial gas surge from products of the incomplete combustion on easy porous have eaten metallic oxides with manganese by concoction is accompanied simultaneous increase being kept in him metal in the manner of metal of the organic join*

Key word: *catalytic system; oxidation of products; elevated temperature; oxides; polymetals; organically; radiography.*

For conversion of the products of the incomplete combustion gas surge to industry the most available and profitable is a dry chemical conversion with the following collecting, allowing realize the conversions of the incomplete combustion in condition of the high temperature and under small contents it in gas mixture and reception in the manner of arid join finally. Catalytic-chemisorption's method peelings gas is founded on chemical before combustion on surfaces of the catalytic system. Introduces the expedient study of the method chemosorbtion's final material of the oxidation and before oxidation products of the incomplete combustion on have eaten the metallic oxides, possessing developed active surface and not requiring additional expenses for its activations. Besides, method allows simultaneously with clear gas to select the metals from departure production, which because of small contents oxides metal had a no using.

Catalytic sorbtion's clearing the gas mixtures from products of the incomplete combustion conducted as on sorbent, artificially actuated oxides manganese, so and secondary material contain oxides manganese. Formed at oxidation chemosorbtion's dioxide products of the incomplete combustion easy wash from times of water. The Study sample mixture conducted physic-chemical methods, electronic spectroscopy, electronic- pair by magnetic resonator (EPR), method of the thermals reconstruction and X-Ray. The oxidation of the products of the incomplete combustion conducted on running laboratory installation with quartz reactor, contain from 0,05 before 0,60% products of the incomplete combustion.

The Studies on conversion and sorptions of the products of the incomplete combustion on

alumina have shown that physical adsorption does not solve a problem to the full. Necessary to enter the active component in composition sorbtion-catalytic system for chemical conversion and collectings of the products of the incomplete combustion.

From number specified above active component possible to note, as oxides alkaline, alkali land and amfotere metal and metal with connecting valence, as iron and manganese. The generalization result own experimental material and literary data by author is installed that catalytic conversion and chemosorbtion products of the incomplete combustion on actuated oxides alkaline, alkali land and amfotere metal and metal with connecting valence, as iron and manganese, brings about forming the join metal at cleaning degree of the gas flow from products of the incomplete combustion. It is installed that in process chemosorbtion are formed join metal, which are accumulated in time sorbtion-catalytic system. At, the amount of the educated join metal corresponds to 78% gross amount sorbtion's product of the incomplete combustion. Saturated by organic join metal system easy can be from is regenerated washing by hot water. However, in spite of positive result on clear from surge of the products of the incomplete combustion have eaten the metallic oxides, including manganese, its industrial use is labored because of insufficient mechanical toughness under raised temperature of the process. The author also explored mechanism of the oxidation of the products of the incomplete combustion on oxides alkaline, alkali land, amphoter's metal and metal with connecting valence, as iron and manganese containing systems. The study modified alumina by oxides manganese has shown that he also can be not used because of difficulties of its regenerations. Besides, explored sorbtion-chemosorbtion-cataleptic's systems of the road and require additional processing for activation their oxides metal. An analysis of the process chemosorbtion is in this connection necessary on cheap, thermo firm and mechanically strong easy rift have eaten the metallic oxides of the secondary origin.

From literature known that amongst metal with connecting valence best are sorbtion-catalytic processes oxides to undermost valence for the reason peelings gas flow from products of the incomplete combustion. The called on author of the study on sorbtion-catalytic conversions of the products of the incomplete combustion on beforehand restored by hydrogen sample has shown that volume of the times when recovering increases approximately in 1,5 times (with 0,2 before 0,3 sm^3/g) and nearly in two times increases the dynamic capacity of the concoction on product of the incomplete combustion. As a result six cycles' peelings gas and extractions from it formed water dissolved join metal, author to manage to extract from concoction 43% oxides of the metal. However using the hydrogen in industrial condition for peelings leaving gas from products of the incomplete combustion is connected with possibility of the formation in zone of the reactions explosive mixture. Besides, use the hydrogen (the road of the agent) is economic not profitable. The Further studies chemosorbtion products of the incomplete combustion by departure conducted without preprocessing by its hydrogen. The product chemosorbtion study of the incomplete combustion manganese by concoction without preprocessing by hydrogen has shown that at equal terms is formed in 1,7 times bounded join less in contrast with processed by ore (the indicator panel. 1).

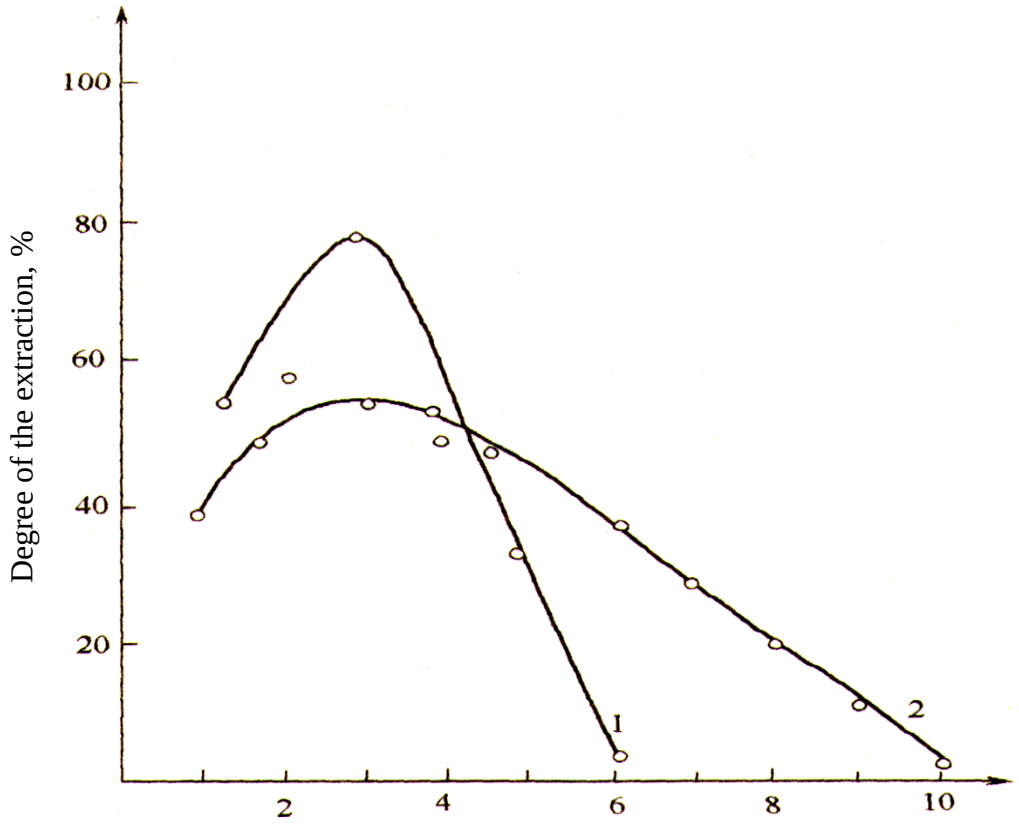
The results some experimental material are shown on rice 1. From crooked, brought on this drawing, follows that restored by hydrogen polymetallic oxides more intensive absorb the gas, than without preprocessing by its hydrogen. The Cleaning degree in the first three cycles increases in consequence of increase of porosity of the absorber under washers connected with

product of the incomplete combustion of the metal. During the following cycles occurs the even reduction a cleaning degree because of exhaustion polymetallic oxides.

Table. 1.

Sorption of the products of the incomplete combustion on polymetallic oxides, not processed and processed by hydrogen

Tehnogene ore	Polymetallic oxides of the secondary origin			Sorption of the products of the incomplete combustion	
	Amount	Size of the granules, mm	Volume of the rifts, sm^3/g	Whole	on 1 gram of ore
Untilled ore	15,00	2÷4	0,21	0,200	0,0140
Processed hydrogen ore at temperature 450°C 60 min.	12,98	2÷4	0,32	0,300	0,0237



Frequentative use mixture polimetallic oxides, number of the cycles

The drawing 1. The Dependency degree extractions of the products of the incomplete combustion in one layer mixture have eaten the metallic oxides with sample from number of the cycle's sorption-regeneration:
Height layer OD, m concentration of the products of the incomplete combustion in source gas

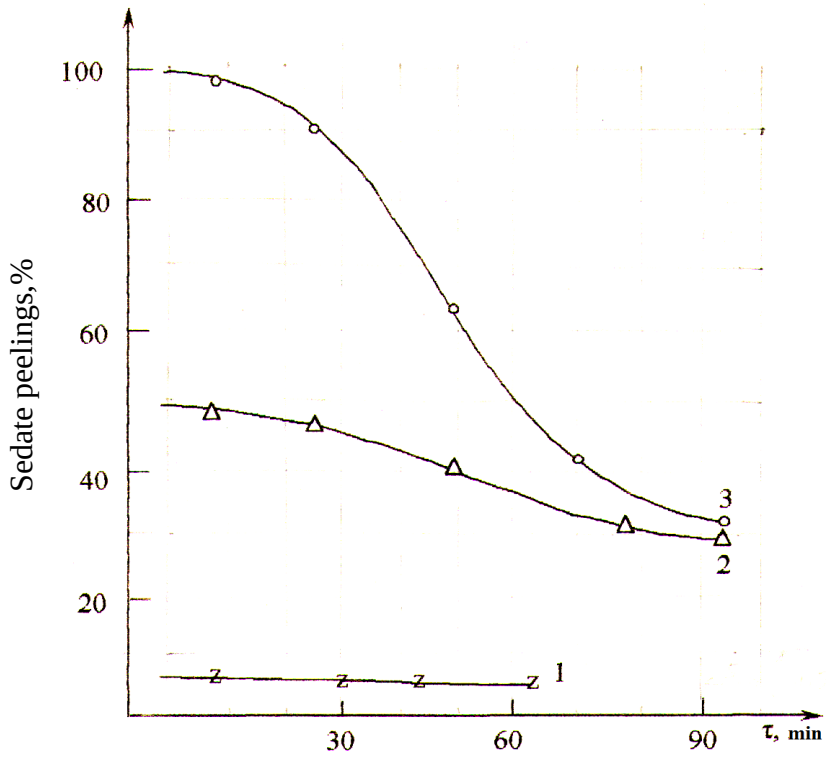
0,5 % about. 1 - beforehand processed by hydrogen; 2 - not processed by hydrogen

It is installed that when recovering by hydrogen has eaten the metallic oxides a reconstruction high oxides metal exists with sample, including manganese in undermost, which in process peelings gas from products of the incomplete combustion form organic join a metal, including manganese, well dissolving in water. For six cycles peelings gas from products of the incomplete combustion restored by departure manages to extract aside from the other oxides metal and 40,1 % oxides manganese. It is Shown that in whiteness of nitrogen and vapor (pair)s of water intensity forming the join metal increases. Departure is recommended for the following studies without preprocessing by hydrogen. In this connection, there was explored not recalled by hydrogen departure, which was good sorbtion-chemosorbtion's by catalytic system for peelings of the gas from products of the incomplete combustion. For the reason clarifications of the mechanism of the forming the organic join metal when clearing the gas from products of the incomplete combustion have polymetallic oxides with sample conducted chemosorbtion products of the incomplete combustion, both in flow of the nitrogen, and under different gas component. The Results are presented in tabl. 2 and on fig. 2. At chemosorbtion of the products of the incomplete combustion by mixture in flow of the nitrogen cleaning degree was small - before 5% on length 60 minutes.

Table. 2.

Results peelings model gas mixture in whiteness of nitrogen, oxygen and vapor (pair)s of water

Sokomponent products of the incomplete combustion	Mass mixture, gram			Amount educated join metal	
	Source	After			
		Chemical collecting of the products of the incomplete combustion	From wash	Whole, gram	In milligramme on 1 gram mixture
Nitrogen	10,16	10,44	9,80	0,64	63
Nitrogen, air(vapor)s of water	11,41	12,16	10,28	1,88	164
Nitrogen, oxygen, pair(vapor)s of water	13,20	14,58	11,58	3,00	227



The drawing 2. The Dependency cleaning degree gas from products of the incomplete combustion at chemosorbtion polimetallik's oxides with manganese by concoction from time under different composition gas mixture:

the three-dimensional velocity Voб-500 chl, concentration dioxide sculptures in source mixture 0,5 % about. 1 - a sorption in flow of the nitrogen; 2 - a sorption in flow of the nitrogen and vapor (pair)s of water; 3 - a sorption in flow of the nitrogen, oxygen and vapor (pair)s of water

Specified above is indicative of that that at data condition peelings forming the salts metal is realized only to account surface atom oxygen of the oxides of the metal on the following scheme:

$$2MeO_x + RO_2 \rightarrow MeO_{x-1} + RO_3 \rightarrow MeSO_4 + MeO_{x-2}.$$

Forming on surfaces sorption's systems to salts metal screen cover the oxides a metal. Clearing the gas from products of the incomplete combustion in flow of the nitrogen goes much weakly and is herewith formed scant few of the salts metal.

At introduction to flow of the nitrogen of the vapor (pair)s of water vastly increases the cleaning degree of the gas from products of the incomplete combustion. As can be seen from result of the studies, with appearance of the vapor (pair)s of water amount increases in zone of the reactions emerging join in 3 times nearly, but maximum cleaning degree gets to 40%. On the grounds of experimental material possible to do the conclusion about significant dug the vapor (pair)s of water when forming the join.

Considering contents of the oxygen in gas surge of industry, hereinafter authors carried in zone of the reactions oxygen. When clearing the gas from products of the incomplete combustion in flow of the nitrogen, the oxygen and vapor(pair)s of water cleaning degree was most in contrast with previous studies in flow, both nitrogen, and moistened nitrogen. At, the reaction of the forming the metallic join becomes complicated and goes on several directions. For clarification of the mechanism of the forming the metallic join at sorption's of the products of

the incomplete combustion polymetallic oxides with additive of the oxides manganese sample researched by means of electronic spectroscopy (the diffusion reflections), x-rays, electron pair magnetic resonance (EPR) and thermo of the programmed reconstruction (TPV).

The Spectrum of the source departure had a high level of the unceasing absorption. This spectrum differed from spectrum of the individual phases Fe_2O_3 and MnO_2, as well as join with insulated ion $Mn^{2+}{}_5$ $Mn^{34"}$, $Mn^{4"1"}$, Fe^{2+}, Fe*. The High level of the absorption is conditioned electronic characteristic not stehiometric oxides connecting metal and is indicative of simultaneous presence in mixture ion manganese and ferric in different valet's conditions.

Blackenning colouration di oxides manganese, her (its) strong conductivity and semiconductor characteristic are conditioned not stehiometric of the oxides and presence in him big amount ion manganese in the other valent conditions.

One result of the studies possible to conclude that in concoction contains oxides associate Mn - O - Mn - O и Fe - O - Fe - O, in chain which, aside from Mn^{4+} и Fe^{3+}, contains ions Mn^{3+} и Fe^{2+}. Exactly presence these ion and causes in spectrum without structured absorption in all range wavelength.

After washing, in consequence of removing with surfaces weakly painted salts, mixture newly gets dark (curve) because of increase the relative contents in mixture ion Mn^{4+}, Mn^{3+} и Fe^{3+}. However intensity after washer from these ion becomes less, than in source mixture (the curve). This occurs in consequence of that that source perfected ore, aside from oxides

Mn^{3+}" и Fe^{3+}, contains AI_2O_3, SiO_2, CaO . After turning ion Мп $^{+}$, Мп" и Fe in the form of the salts we their washing. Herewith relative contents colorless oxides SiO_2, CaO, $A1_2O_3$ and other increases, but amount MnO_2 and Fe_2O_3 decreases. This and is caused change line electronic spectrum sample under frequentative xemosorbtion and regenerations (the curve). Consequently, at xemosorbtion of the products of the incomplete combustion ion

Mn^{4+}, Mn^{3+} and Fe^{3+} moves over to undermost valent condition and form to salts. When washing of these salts washing, mixture is impoverished oxides by join manganese and ferric, and in she remains mixture an oxides SiO_2, CaO, $A1_2O_3$.

The Used concoction contains in its composition set element join manganese and ferric. In the course of chemical collecting of the products of the incomplete combustion big part high valent's of the join ion manganese and ferric moves over to bivalent condition. Whereas, some area of the absorption different valent's conditions ion manganese and ferric are imposed friend on friend, but majority studied sample possesses bad allowed by structure, were organized additional studies of the concoction by method EPR and crooked reconstruction (KB). The ambiences dug For revealing on adsorption's characteristic of the concoction was an extended amount sample, herewith important role was conducted modeling of the different conditions ferric and manganese, as well as their oxides:

$$Fe_2O_3 , MnO_2 , MnO.$$

Thereby, study of the concoction by method EPR has shown that already in on-line forms in he is kept two pairs magnetic conditions ion ferric and manganese. The Concentration their several are changed under is roasted mixture in ambience pair. At, the intensity of the central signal falls double. Increase existed In the course of absorptions of the concoction dioxides of the sulphur to intensities of the central signal in 10 once nearly.

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